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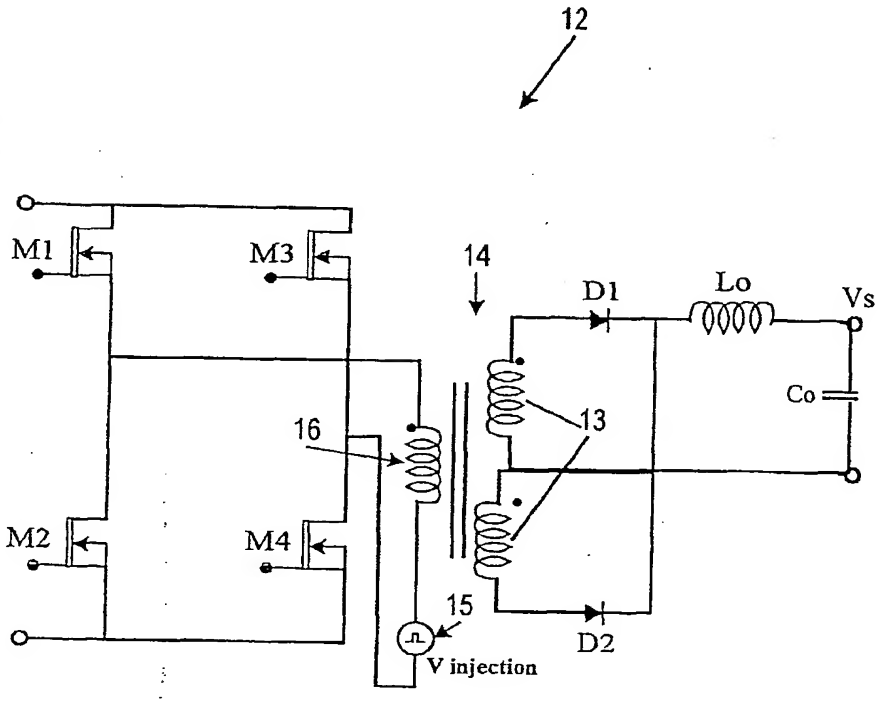
(54) Title: SOFT SWITCHING CONVERTER USING CURRENT SHAPING




(57) Abstract: A converter topology that eliminates reverse recovery losses in its output rectifying semiconductor devices employs an AC injection voltage source in series with a power transformer primary winding. Input semiconductor switches in the converter's primary circuit are controlled to provide in the power transformer secondary a voltage across the winding or windings in a first direction forward biasing one of the output rectifying devices followed by a lower level reverse biasing voltage produced by the injection voltage. This lower level voltage across the secondary turns off the previously conducting rectifier device and drives carriers out of its semiconductor junction or junctions to eliminate reverse recovery losses occurring when the secondary applies a higher level reverse bias across the non-conducting rectifier device. The injection voltage source can be a transformer in addition to the power transformer having a primary winding in series with the primary winding of the power transformer and a secondary winding connected to ground through a capacitor. In addition to preventing reverse recovery losses in the rectifying devices in the secondary, the injection voltage transformer also injects an AC triangular waveform current into the current in the converter primary input circuit to the junction of the semiconductor switches where they are connected in a bridge circuit supplying the power transformer primary. By this, the injection voltage source assures zero voltage switching of the semiconductor switches even at light loads.

WO 03/088467 A2